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United States
Coast Guard

ET2 UNIT 2: EQUIPMENT & PERSONNEL SAFETY

EPQ 5.C.01 How to Inspect Electronic Spaces for Required Warning Signs

Coast GUARD
Training Center Petaluma

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ET2 UNIT 2: EQUIPMENT & PERSONAL SAFETY

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QUESTIONS ABOUT THIS TEXT SHOULD BE ADDRESSED TO THE SUBJECT MATTER SPECIALIST FOR THE ELECTRONICS TECHNICIAN RATING

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Acknowledgments and References

Acknowledgments

Material is included in this pamphlet through courtesy of the designated source. The Coast Guard appreciates permission of the source to use this material, which contributes greatly to the effectiveness of this course. No copies or reproductions of the material are authorized without permission of the appropriate source.

The Coast Guard wishes to thank the following individuals for their expertise and support in the development of this document:

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List of References

This pamphlet contains original material developed at the U. S. Coast Guard Training Center, Petaluma, California, and excerpts from the following technical publications:

- *Electronics Manual*, COMDTINST M10550.25 (series)
- *CMplus 5.1 Job Aids*
- MLC Standard Operating Procedures
- System Integrated Logistics Support (SILS) Command Policy Manual, COMDTINST M4105.8 (series)

Notice to Students

Purpose

This pamphlet serves to provide you with knowledge of how to address certain administration and documentation tasks required of an ET2.

Important Note

This text has been compiled for TRAINING ONLY. It should NOT be used in place of official directives or publications. The test information is current according to the references listed. You should, however, remember that it is YOUR responsibility to keep up with the latest professional information available for your rating. Current information is available from the *Enlisted Performance Qualifications Manual*, COMDTINST M1414.8 (series).

Course Content

This course content is based on the requirements stated in the *Enlisted Performance Qualifications Manual*, COMDTINST M1414.8 (series).

Pamphlet Content

This pamphlet contains one lesson:

Lesson 1: How to Inspect Electronic Spaces for Required Warning Signs

Performance Qualifications

This pamphlet covers the following enlisted performance qualification (EPQ) for ET2 from the *Enlisted Performance Qualifications Manual*, COMDTINST M1414.8 (series):

5.C.01 INSPECT electronics equipment spaces to ensure required warning signs are posted per the Electronics Manual, COMDTINST M10550.25 (series). Signs include, but are not limited to:

- RF Radiation Hazard
- High Voltage Warning
- Shock Hazard Warning
- CPR Procedures
- Multiple Power Sources
- Permissible RF exposure areas
- Toxic Gas warning
- Hearing Protection requirements

Notice to Students (continued)

Learning Objectives

Read the learning objectives before you begin reading the text. The objectives will guide you through the text and help you answer the questions in the self-quiz at the end of each lesson.

Quizzes

Each lesson has a self-quiz and pamphlets may have a pamphlet review quiz. You will find answers to each quiz on the pages following the quiz. Included are reference pages for the answers.

These self-quizzes are meant to check your comprehension of the material you covered. If you have problems understanding a section, go through it again or ask someone for help. The pamphlet review quiz questions are samples of the type of questions you will find on the end-of-course-test (EOCT).

SWE Study Suggestion

Servicewide exam questions for your rate and pay grade are based on the Professional and Military Requirements sections of the *Enlisted Performance Qualifications Manual*, COMDTINST M1414.8 (series).

If you use the references from this text and consult the *Enlisted Performance Qualifications Manual*, you should have good information for review when you prepare for your servicewide exam (SWE).

Glossary of Terms

A glossary of terms is included at the end of this pamphlet as Appendix A.

Lesson 1

HOW TO INSPECT ELECTRONIC SPACES FOR REQUIRED WARNING SIGNS

Overview

Introduction

Accidents do not happen without a cause; when each individual can be made aware of the hazards involved with his work, fewer accidents will result. Warning signs and posters shall be placed in electronics spaces to help prevent personnel from accidentally coming in contact with dangerous voltages, radio frequency (RF) radiation, poisonous gases, and other hazards.

Lesson Objectives

Given a job aid, **INSPECT** electronics spaces to ensure that the following warning signs are posted:

1. RF radiation hazard
2. High voltage warning
3. Shock hazard warning
4. CPR
5. Multiple power sources
6. Permissible RF exposure areas
7. Toxic gas warning
8. Hearing protection requirements

- **IDENTIFY** the regulations for warning signs in electronic equipment spaces.
- **IDENTIFY** the requirements for each warning sign listed above.
- **IDENTIFY** the procedures required when a discrepancy is found during an inspection.

Continued on next page

Overview (Continued)

References

The following references were used for this lesson:

- Electronics Manual, COMDTINST M10550.25 (series)
- Safety and Occupational Health Manual, COMDTINST M5100.47 (series)
- Operational Risk Management, COMDTINST M3500.3 (series)
- NAVSEA SE000-01-IMB-010, EIMB General Maintenance, Part VI
- Naval Ships Technical Manuals, Chapter 300
- Coatings and Color Manual, COMDTINST M10360.3C (series)

Regulations

Introduction

Executive Order 12196, Occupational Safety and Health Programs for Federal Employees, requires the Coast Guard to maintain a safety and occupational health program in accordance with the Occupational Safety and Health Act of 1970 for civilian employees under the Occupational Safety and Health Administration (OSHA).

Although exempted from OSHA standards, Coast Guard military personnel, except where engaged in uniquely military operations, **shall comply** with and enforce OSHA standards.

OSHA Standards

OSHA CFR 29 Part 1910 Occupational Safety and Health Standards contain the specifications for accident prevention signs and tags. These specifications apply to the design, application, and use of signs or symbols intended to indicate and, insofar as possible, define specific hazards of a nature such that failure to designate them may lead to accidental injury to workers or the public, or both, or to property damage. These specifications are intended to cover all safety signs except those designed for streets, highways, railroads, and marine regulations.

CG Policy

The fundamental safety and environmental health risk management process is a subset of the Coast Guard's overall risk management policy as described in Operational Risk Management, COMDTINST M3500.3 (series).

In addition, the Coast Guard's Safety and Occupational Health Manual, COMDTINST M5100.47 (series), provides policy on hazard identification and discrepancy reporting procedures.

Continued on next page

Regulations (Continued)

Risk Management Process

Risk management is a continual process and is primarily an individual and unit responsibility, facilitated, where necessary, and monitored by safety and environmental health professional. There are three primary steps within the risk management process:

1. Identification of hazards
2. Risk assessment
3. Risk control

Risk Control

Risk control is the overall goal of the safety and environmental health risk management process.

This lesson pertains to a portion of the risk control step, which is defined as the process of developing and implementing measures to control risk. The preferred priority is:

- Engineering controls
- Administrative procedures/work practices (training, procedures, and signs)
- Personnel protective equipment

RF Radiation Hazards

Introduction

RF radiation from radar, communications, and Loran transmitters is hazardous and causes undesirable effects under certain conditions both ashore and on ships. There are eight types of RF radiation hazard signs used for specific areas of RF radiation.

Location

Each sign has been designed for a specific location. In general these signs shall be posted in locations where personnel may be exposed to radiation hazards (RADHAZ). For specific locations, see each type sign in the chart below.

Types of Signs

Each sign is labeled according to type (1 through 8). Type 1 is used for permissible RF exposure areas and is covered later in this lesson. All RADHAZ signs have the following specifications:

- Base material 0.004” thick outdoor white vinyl
- Permanent acrylic adhesive backing
- Screen-printed labels with ultra-violet inks
- Bleeds screened as requested by artwork
- Black ink for lettering
- Red and yellow checked triangle
- 5” square for normal shipboard use
- 12” square for COMMSTAs, DGPS Broadcast Sites, shore installations, and flight-deck use

Type	Picture	Description/Location	Size	Stock Number
2		Excludes personnel from proceeding past a designated point unless in compliance with established RADHAZ avoidance procedures. Install at eye level on doors or between the handrails of inclined ladders. When used as temporary barriers, these signs shall be waist level on a non-metallic rope, requiring that personnel approaching the area take positive action to pass. Type 2 signs shall not be used to limit access to an area that is not subject to RADHAZ, nor inside a RADHAZ area where personnel are already exposed to RADHAZ before the sign can be viewed.	5 in. 12 in.	7690-01-377-5895 7690-01-377-5082

Continued on next page

RF Radiation Hazards (Continued)

Types of Signs (Cont'd) Types of RF RADHAZ signs are described below:

Type	Picture	Description	Size	Stock Number
3		Advise personnel not to touch, or to use special handling procedures when touching, metallic objects that can cause RF burns. Install on the RF burn source or in the immediate vicinity where easily seen. When used on cargo handling or running rigging, signs are to be mounted on the hook insulator and personnel are to be warned not to touch the wire/rigging above the insulator. More than one sign should be installed on larger burn sources that can be approached from more than one direction.	5 in. 12 in.	7690-01-377-5896 7690-01-377-5098
4		Advise personnel of HERF. These requirements apply only to storing aviation gasoline or automotive gasoline. Marine diesel fuel and JP-5 jet fuel are not considered to have a HERF problem and require no special electromagnetic safety precautions during fueling. Install above gasoline fueling stations. These signs should be used to ensure that personnel are aware of the command's HERF policies.	5 in. 12 in.	7690-01-377-5899 7690-01-377-5900

Continued on next page

RF Radiation Hazards (Continued)

Types of Signs (Cont'd) Types of RF RADHAZ signs are described below:

Type	Picture	Description	Size	Stock Number
5		Advise personnel of procedures to follow when other RADHAZ warning signs are not appropriate to ensure personnel safety. This sign contains a blank area in which special precautions, necessary for safe operations, can be typed. Examples of data appropriate to a type include: • Inform OOD before placing system in radiate mode. • In manual mode, do not depress below horizon between ____ and ____ degrees relative. • Ensure that temporary exclusion barriers are in place before radiating. • Do not stop antenna between ____ and ____ degrees when radiating. Installed below decks in a system equipment room where easily viewed by system operators while positioned for normal operation, in the vicinity of the applicable controls (e.g., radiate switch, antenna control switch, etc). When mounted on system cabinets or control panels, signs shall not cover or obscure switch labels, meters, indicators or nameplates.	5 in. 12 in.	7690-01-377-5374 7690-01-377-5375
6		Advise personnel not to operate transmitters within designated areas. Personnel not familiar with the Command's requirements for transmitter operation are to check with the OOD prior to operating transmitters. Installed in all areas designated by the Command.	5 in. 12 in.	7690-01-377-5444 7690-01-377-5447

Continued on next page

Types of Signs (Cont'd) Types of RF RADHAZ signs are described below:

Type	Picture	Description	Size	Stock Number
7		Advise personnel of HERO. Install signs in areas where ordnance is loaded and near the unit's magazines. These signs should be used to ensure that personnel follow the command's HERO policies.	5 in.	7690-01-377-5901
8		Advise personnel operators to refer to the unit's HERO Emission Control Plan prior to operating the transmitter. It is important that HERO procedures for restricting RF emissions be thoroughly understood and followed. Installed at command designated transmitters.	5 in.	7690-01-377-5901

High-Voltage Warning

Introduction

Compartments or walk-in enclosures containing equipment with exposed conductors presenting shock hazards in excess of 500V RMS or DC must be clearly marked with a sign stating “DANGER HIGH VOLTAGE.”

Location

The signs shall be posted so that they are obvious and can be clearly read upon entrance. Additional signs may be posted at or near the exposed conductors within the space. Warning information may also be stenciled onto an object that contains high voltage, e.g., a circuit breaker panel.

Types of Signs

There are three sizes of high-voltage warning signs. Refer to the chart below:

Type	Picture	Description	Size	Stock Number
1		Black, white, and red fiberglass for use inside and outside	10 x 14 in.	9905-01-050-7960
2		Black, white, and red steel with a baked enamel finish	7 x 10 in.	9905-00-971-7168
3		For use inside only, laminated placard. Colors for danger and warning signs shall be red and black with a white background	8 x 4 in.	

Circuit Breaker Panel

An example of a circuit breaker panel with a stenciled warning is depicted below.

Shock Hazard Warning

Introduction

Compartments or walk-in enclosures containing equipment with exposed conductors at potential of 30V RMS or DC and 500V RMS or DC shall have either a “Danger High Voltage” or a “Danger Shock Hazard” sign. There are two sizes of shock hazard warning signs.

Location

The signs shall be posted so that they are obvious and can be clearly read upon entrance. Additional signs may also be posted at or near the exposed conductors within the space.

Type of Sign

“Danger Shock Hazard” signs may be manufactured in accordance with NAVSEA Drawing Number 807-2699757. There are two sizes of shock hazard warning signs. Refer to the chart below:

Type	Picture	Description	Size	Stock Number
1		Made with 18-gauge-sheet steel. Colors for danger and warning signs shall be red and black with a white background.	7 x 10 in. 3 ½ x 5 in.	

CPR Warning

Introduction

There is no Coast Guard regulation covering the requirements of where and what type of cardiopulmonary resuscitation sign is required within electronics spaces. However, the Office of Health Services (CG-112) stated that a CPR sign is required.

Location

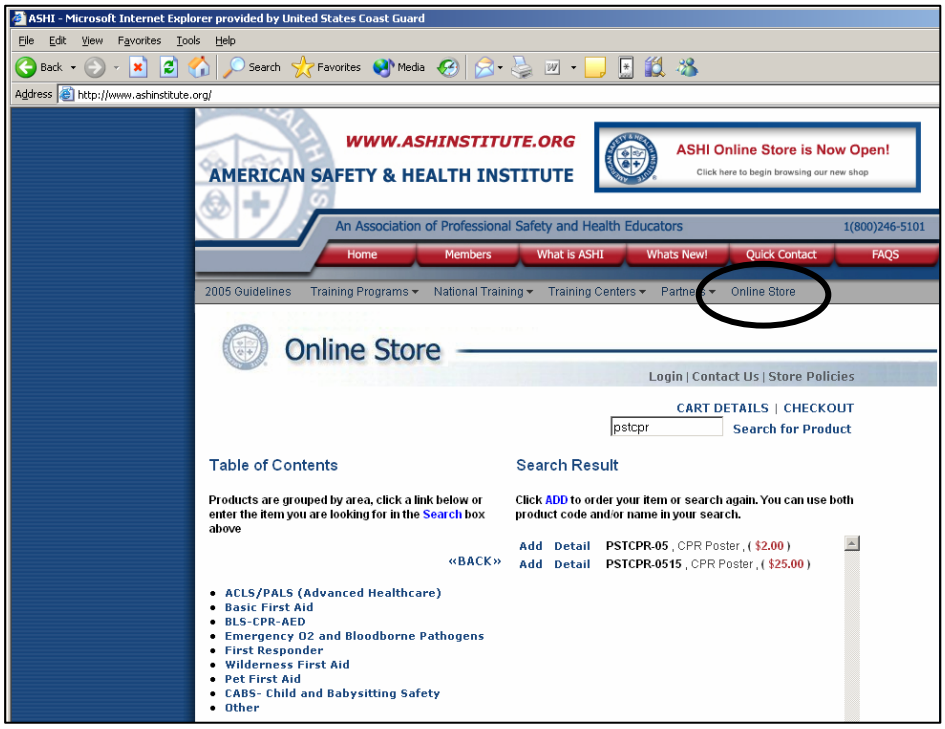
CG-112 stated that the CPR sign should be conspicuously posted where electronic equipment is present or personnel work. The sign must be viewable and readable from anywhere in the space.

Type of Sign

CPR signs must present the American Heart Association standard for providing cardiopulmonary resuscitation to adults.

The following is a link to the American Safety & Health Institute; approved CPR posters may be procured through ASHI's online store:

http://www.ashinstitute.org



Multiple Power Sources

Introduction

Any equipment that has more than one power source (any equipment with 12V or more) shall be labeled, indicating multiple power sources, as per Naval Ships' Technical Manual, Chapter 300.

Location

The multiple power sources labeling tag shall be affixed to the equipment or the equipment's power sources in a conspicuous place that can be viewed by personnel working on or near the equipment.

Types of Signs

There are several different types of safety tags that can be used to warn personnel of multiple power sources. Refer to the chart below:

Type	Picture	Description	Size
1	*"Do Not Throw Switch, men at Work on Circuits"*	Cardboard tag with an attached cord stating "Do not throw switch, men at work on circuits."	7½ x 4 in.
2		Plastic tag with an attached cord. Tag provides a place for the technician to sign name and date. Colors are white letters on a red background, for danger. The body has a white background with black letters for the message.	5-5/8 x 3¼-in.
3		Plastic tag with a large brass grommet used to attach a string for hanging. Tag provides a place for the technician to sign name and date. Colors are the same as specified above.	5-5/8 x 3¼-in.

Permissible RF Exposure Areas

Introduction

Permissible Exposure Limits (PELs) are times set to allow the human body time to dissipate or "cool" before returning to the RF field to ensure that no injury occurs. PELs are determined by the antenna's effective radiated power, power density, and distance to the source of the radiation. PEL boundaries are used to restrict or limit access to RADHAZ zones and ensure that personnel entering a zone do not exceed the PEL. These RADHAZ zones are also known as *permissible RF exposure areas*.

Location

Permissible RF exposure areas are marked with RADHAZ warning sign at eye level (or where it can easily be seen) outside the PEL boundary. Where applicable, a sign should be posted at each end of the boundary area.

Shipboard Location

A four-inch-wide red (11105) warning line shall be painted on the deck to designate RADHAZ zones in areas where posting of signs is not applicable. Location of the warning lines will be found in a modification to the ship's drawings.

Type of Sign

Permissible RF exposure areas use an RF RADHAZ type 1 sign with a red and yellow-checkered triangle and black lettering. Refer to the chart below for a picture, size, and ordering information.

Picture	Description/Location	Size	Stock Number
	Advise personnel not to linger in the area surrounding RF antennas where the MPE can be exceeded. Install at eye level (or where sign can easily be seen) outside the PEL boundary. When applicable, post a sign at each end of the boundary.	5 in. 12 in.	7690-01-377-5893

Toxic Gas Warning

Introduction

All areas near smoke pipe (stack) gases shall have warning signs posted to alert personnel working aloft. These gases are toxic and can quickly incapacitate personnel working near smoke pipes.

Location

One sign should be mounted near the bottom of each access ladder leading aloft, and another sign should be located at the top of each ladder mounted on the outside of the antenna pedestal.

Type of Sign

The toxic gas warning sign should read as follows:

> **DANGER**
>
> Personnel are cautioned to guard against poisonous effects of smoke pipe gases while servicing equipment aloft. When servicing equipment in the way of smoke pipe gases use oxygen breathing apparatus and a chest telephone or throat microphone set for communication with others in working party. Obtain necessary equipment before going aloft.

Type	Picture	Description	Size	Stock Number
1		Steel with baked enamel finish. Colors are white letters on a red background for danger. The body has a white background with black letters for the message	8 ¼ x 10 in.	0177-LF-226-2900

Hearing-Protection Requirements

Introduction

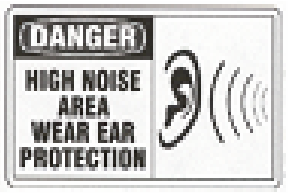
COMDTINST M5100.47 (series) provides the latest requirement for noise standard. Environments or equipment that produce an eight-hour TWA of 85 dB(A) or greater are considered hazardous; protective measures must be taken to reduce exposure to personnel.

Location

The actual measurements and posting of the hearing-protection, high-noise sign are the responsibility of an industrial hygienist or environmental inspector, under the cognizance of MLC (kse).

Types of Signs

There are several types and sizes of hearing-protection warning signs. Refer to the chart below:

Type	Picture	Description	Size	Stock Number
1		The small size is made of plastic or fiberglass. The large can be aluminum or fiberglass. Some versions have self-adhesive backing. Colors are white letters on a red background for danger. The body has a white background with black letters for the message	10 x 14 in.	Industrial & Safety Supplies; item # 17665PLLLSS
			7 x 10 in.	
2		Semi-rigid plastic sign. Colors are yellow letters on a black background for caution. The body has a yellow background with black letters for the message.	10 x 7	Industrial Safety Company; item # 16031

Inspection Checklist

Introduction

Safety and environmental health are individual and unit responsibilities. Therefore, both are responsible for identifying hazards, and the unit is primarily responsible for monitoring compliance with safe practices.

Safety and environmental health checklists designed for use by unit personnel are available, via the intranet, on the MLC (kse) website to assist in identifying safety and environmental health hazards and program deficiencies. Portions of the MLC (kse) checklist can be found in Appendix B. For complete checklists, refer to the following internet site:

http://www.uscg.mil/mlclant/KDiv/kseChecklist.htm

Checklist

For the purposes of this lesson, a detailed checklist for the inspection of electronics spaces is provided below. Use the checklist to inspect electronics spaces for the required warning signs. Check the "Yes" box if required sign is present, correct type, and in the correct location. Check the "No" box if there is a discrepancy. Check the "N/A" box if the sign is not applicable for the space being inspected.

NOTE

This checklist is provided as part of the PQG for this lesson. An additional blank checklist can be found in Appendix B.

Continued on next page

Inspection Checklist (Continued)

Checklist (Cont'd) The inspection checklist is shown below:

Type Sign	Required Area(s)	Yes	No	N/A
RF Radiation (RADHAZ)	Areas where there are established RADHAZ avoidance procedures. In-stalled at eye level on doors or between the handrails of inclined ladders. When used as temporary barriers, signs shall be waist level on a non-metallic rope.			
RF Radiation (RF Burns)	Objects or areas that cause RF burns. Install on the RF burn source or in the immediate vicinity where easily seen. When used on cargo handling or running rigging, signs are to be mounted on the hook insulator; personnel are to be warned not to touch the wire/rigging above the insulator. More than one sign should be installed on larger burn sources that can be approached from more than one direction.			
RF Radiation (HERF)	Areas storing aviation gasoline or automotive gasoline. Installed above gasoline fueling stations.			
RF Radiation (Other RADHAZ)	Special areas where normal RADHAZ warning signs are not appropriate to ensure personnel safety. The sign contains a blank area in which special precautions, necessary for safe operations, can be typed.			
RF Radiation (Transmitters)	Areas designated by the command for not operating transmitters without prior permission from the OOD.			
RF Radiation (HERO)	Areas where ordnance is loaded, near the unit's magazines.			
RF Radiation (HERO Emission Control)	Areas, designated by the command, at or near transmitters. These areas have restrictions for RF emissions.			
High Voltage	Compartments or walk-in enclosures containing equipment with exposed conductors that present shock hazards in excess of 500V RMS or DC.			
Shock Hazard	Compartments or walk-in enclosures containing equipment with exposed conductors at potential of 30V RMS or DC and 500V RMS or DC.			
CPR Warning	Posted in all spaces where electronic equipment is present or personnel work. The sign should be viewable and readable from anywhere in the space.			
Multiple Power Sources	Labeling tag shall be affixed to the equipment, or the equipment's power sources, in a conspicuous place that can be viewed by personnel working on or near the equipment.			
Permissible RF Exposure Area (RADHAZ Type 1)	Area surrounding RF antennas where the PEL can be exceeded. Installed at eye level (or where the signs can easily be seen) outside the PEL boundary.			
Toxic Gas	One sign should be mounted near the bottom of each access ladder leading aloft and another sign should be located at the top of each ladder mounted on the outside of the antenna pedestal.			
Hearing Protection	Areas in which environments or equipment produce an 8-hour TWA of 85 dB(A) or greater.			

Discrepancy Procedures

Introduction

Supervisory personnel may conduct routine inspections in conjunction with material inspections or other normal workplace inspections. The objective is to identify physical hazards, such as damaged electrical circuits, blocked exits, and missing or improper warning signs.

The early detection of unsafe and unhealthy working conditions and prompt correction of related hazards at the lowest possible working level are essential elements used in the Coast Guard.

Hazard Identification

Refer to the chart below for a description of the four types of hazard reports.

Report Type	Description
Oral	Coast Guard personnel are encouraged to make oral reports to supervisors as the most prompt and effective method of hazard identification.
Written notices (CG-5082)	Coast Guard military personnel or employees may submit a written notice of suspected unsafe condition in a workplace by completing a Hazardous Condition Notification (CG-5082). See the appendix for an example form.
Directly to Commandant G-KSE	Coast Guard civilian employees may submit a completed USCG Employee Hazard Report (CG-4903) directly to the Commandant (CG-11). See the appendix for an example form.
Agency or negotiated grievance	Civilian Coast Guard employees may use the agency or negotiated grievance procedure or they may write directly to OSHA.

Hazardous Conditions Log

The USCG Hazardous Conditions Log (CG-4905) shall be used by commands as a uniform tracking tool to prioritize and manage hazard abatement. The Hazardous Conditions Log is authorized for local reproduction. See the appendix for an example.

Continued on next page

Discrepancy Procedures (Continued)

Report Procedure

Follow the procedure below to correct any warning sign discrepancies found during routine or material inspections.

Step	Action
	Provide an oral report to the supervisor of the electronics space. Include details observed from the inspection checklist.
	Ensure that the report includes: • What type of sign is missing or misplaced • Reasons why the sign is required • Reasons why the sign should be in a certain location
	Follow up to ensure that the supervisor completes the Hazardous Condition Notification (CG-5082).
	Follow up to ensure that missing signs are placed on order or that signs are placed in proper location.

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Practice Exercise

Exercise Instructions

This exercise is meant to check your comprehension of the material covered in this lesson. Read each question and write the answers in the spaces provided. Check your answers in the Feedback section following the exercise. If you are having difficulty understanding a section, go through it again or ask someone for help.

Exercise 1

1. What Executive Order requires the Coast Guard to maintain a safety and occupational health program? _____

2. What OSHA regulation contains specifications for accident prevention signs and tags? _____

3. What Coast Guard manual provides policy on hazard identification and discrepancy reporting procedures? _____

4. How many RF radiation hazard type signs are there? ___

5. What size RADHAZ sign is required for shipboard use? _____

6. What type RADHAZ sign is required at gasoline fueling stations? _____

7. RADHAZ type 6 signs advise personnel not to _____.

8. Where should high voltage warning signs be placed? _____

9. What are the standard colors for danger signs? _____

10. CPR warning signs must present the _____ _____ for providing cardiopulmonary resuscitation to adults.

11. How many CPR signs are required in an electronics space? _____

12. Multiple power sources tags are normally located on _____.

Continued on next page

Practice Exercise (Continued)

Exercise 1 (cont'd)

13. What are PEL boundaries used for? _____ _____.

14. Where are the two locations for placing toxic gas warning signs? _____.

15. COMDTINST M5100.47 states that environments that produce _____ or greater are considered hazardous.

16. What is the easiest and most prompt method used to report hazards to the command? _____

17. What is the form number of the USCG hazardous conditions log used to track, prioritize, and manage hazard abatement? _____

18. Every discrepancy report to correct warning signs should include:_____ _____ _____.

19. Coast Guard and civilian employees may submit a written report of unsafe conditions in a workspace by completing a _____.

Feedback

Exercise 1

Compare your answers to the following:

Question	Answer	Reference Page
1	EO 12196	1-3
2	CFR part 1910	1-3
3	COMDTINST M5100.47	1-3
4	Eight	1-5
5	5-inch square	1-5
6	Type 4	1-6
7	Operate transmitters within designated areas	1-7
8	Compartments or walk-in enclosures containing equipment with exposed conductors presenting shock hazards in excess of 500V RMS or DC	1-9
9	Red and black with a white background	1-10
10	American Heart Association standard	1-11
11	One	1-11
12	Electronic circuits	1-12
13	To restrict or limit access to RADHAZ zones	1-13
14	Near the bottom of each access ladder and at the top of each ladder	1-14
15	Eight-hour TWA of 85 dB (A)	1-15
16	Oral report	1-18
17	CG-4905	1-18
18	What type of sign is missing or misplaced, reasons why it is required, reason why it should be in a certain location	1-19
19	CG-5082	1-18

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Appendix A
GLOSSARY

HERF Hazards of Electromagnetic Radiation to Fuel

HERO Hazards of Electromagnetic Radiation to Ordnance

MPE Maximum Permissible Exposure—the MPE limits (also known as *PEL*) have been set to allow the body enough time to dissipate or "cool" before returning to the RF field to ensure that no injury occurs.

PEL Permissible Exposure Limit. A PEL boundary is established to delineate the RADHAZ exclusion zones, areas where the potential RF radiation exceeds the general public/ uncontrolled exposure of radiation. Boundaries can also be used to restrict access to a RADHAZ exclusion zone, ensuring that personnel entering an area do not exceed the limit. See "Permissible RF Exposure Areas."

RADHAZ RF radiation hazards

TWA Time weighted average—the average concentration of a chemical substance or physical energy measured or calculated for an eight-hour workday and 40-hour workweek.

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Appendix B
FORMS

MLC Checklist

Below is a portion of the U.S. Coast Guard Safety and Environmental Health Vessel Checklist that is applicable for this lesson. The block arrows point to specific checklist numbers for warning signs.

Radiation Safety Checklist (Vessel)

Checklist N/A Number	Checklist ** Indicates a Significant Program Indicator	Reference	Yes No
RS-01	The Electronics Doctrine addresses proper handling and storage procedures for cathode ray tubes and other electron tubes.	COMDTINST M10550.25, Chapter 2.C.3.b and c	
RS-02	All personnel are trained on the permissible exposure limit (PEL) for electromagnetic radiation hazards and are made aware of PEL boundaries.	COMDTINST M10550.25, Chapter 2.D.2.a.3 and Chapter 2.D.3.c	
RS-03	** High voltage signs are posted near antennas, radar, and electrical equipment.	COMDTINST M10550.25, Chapter 2.A-3.c	
RS-04	** Permissible Exposure Limit (PEL) boundaries are clearly identified for all electromagnetic radiating antennas and other electromagnetic radiation hazards.	COMDTINST M10550.25, Chapter 2.D.3	
RS-05	** Personnel are not exposed to electromagnetic energy.	COMDTINST M10550.25, Chapter 2.D.3	
RS-06	** Modern electron tubes (e.g., high power klystrons, magnetrons, thyrotrons, cathode ray tubes, high voltage rectifiers) are properly shielded.	COMDTINST M10550.25, Chapter 2.D.3.d	
RS-07	** RF radiation warning signs are posted near radio transmitting equipment.	COMDTINST M10550.25, Chapter 2.D.2.a.(4)	
RS-08	** Safety precautions are being adhered to by personnel to guard against RF induced voltage, to prevent shock to personnel, actuation of electrically operated devices, and ignition of flammable materials or vapors.	COMDTINST M10550.25, Chapter 2.B.2	
RS-09	Personnel are aware of PEL boundaries, radiation hazard exposure prevention and unit training.	COMDTINST M10550.25, Chapter 2-D	

Continued on next page

Appendix B

FORMS (Continued)

CG-5082 Below is a sample Hazardous Condition Notification form. Blank forms and instructions for completing can be found in the CG Adobe Forms. Also see COMDTINST M5100.47 (series), Enclosure (1) for instructions.

U.S. DEPARTMENT OF HOMELAND SECURITY
U.S. COAST GUARD
CG-5082 (6-04)

HAZARDOUS CONDITION NOTIFICATION

Identification Number

1. NAME AND ADDRESS OF UNIT

2. OPFAC NUMBER (7-13)

3. DATE (14-19) MO DA YR

4. TYPE OF NOTIFICATION (20) (Check one only)

☐ A SAFETY SPECIALIST NOTIFICATION ☐ C SAFETY SPECIALIST INVESTIGATION

☐ B EMPLOYEE NOTIFICATION

5. NARRATIVE (Describe condition, suggest solution, cite standard violated, give exact location, identify equipment, etc.) (Use additional paper as required)

6. ADP DATA - NARRATIVE BASE

(21-45)
(46-70)
(71-95)
(96-120)

7. ADP DATA - STANDARD VIOLATED (1-25)

8. ADP DATA - LOCATION (26-50)

9. ADP DATA - COST, TIME, CRITICALITY

EST. COST DOLLARS (51-57) EST. COMP. TIME (58-60) CRITICALITY (61)

10. SAFETY SPECIALIST CODE AND SIGNATURE

CODE (62-63) SIGNATURE _____

11. ADP DATA - COST AND COMP. DATE (Completed by Unit C.O.)

ACT. COST DOLLARS (64-70) COMP. DATE MO DA YR (71-76) SIGNATURE _____

Continued on next page

Appendix B

FORMS (Continued)

CG-4903 Below is a sample USCG Employee Hazard Report form. Blank forms and instructions for completing can be found in CG Adobe Forms. Also see COMDTINST M5100.47 (series), Enclosure (1) for instructions.

U.S. DEPARTMENT OF HOMELAND SECURITY U.S. COAST GUARD CG-4903 (Rev. 6-04)	**USCG EMPLOYEE HAZARD REPORT** (See Instructions on Page 2)	Hazard Report No. _____ (Assigned by Safety Office)

HAZARD (Completed by individual reporting hazard)

Reports may be submitted anonymously. Reprisals for reporting actual or suspected hazardous conditions are forbidden (COMDTINST M5100.47 Chapter 1)

To: Unit Safety Supervisor/Safety Officer	From: (Optional) Name, Organization

Description of Hazard (Date, Time, Summarize - Who, What, When, Where, How, Why)

Facility, Procedure, Equipment (Type, Model, Serial Number) or Material Involved

Recommendations (What you think will solve the problem)

INVESTIGATION OF HAZARD

Criticality: Imminent Danger ☐ Serious ☐ Non-Serious ☐

Summary of Investigation (Cite Standard Violated)

Recommendations by Safety Investigator

Action Taken by Office of Primary Responsibility

Date Received	Reviewer	Signature of Reviewer
Date Forwarded	Investigator/Action Officer	Signature of Investigator
Date Closed		

Continued on next page

Appendix B
FORMS (Continued)

CG-4905 Below is a sample USCG Hazardous Conditions Log. Blank forms and instructions for completing can be found in CG Adobe Forms.

USCG HAZARDOUS CONDITIONS LOG

DATE RECEIVED	LOCATION	NUMBER	HAZARDOUS CONDITION	CORRECTIVE ACTION	FOLLOW-UP	CORRECTED

Date Reviewed	Reviewing Person	Signature of Reviewer
Date Followed-up		
Next Follow-up Due		

Continued on next page

Appendix B
FORMS (Continued)

Blank Checklist Below is a checklist for inspecting electronics spaces.

Type Sign	Required Area (s)	Yes	No	N/A
RF Radiation (RADHAZ)	Areas where there are established RADHAZ avoidance procedures. Installed at eye level on doors or between the handrails of inclined ladders. When used as temporary barriers, signs shall be waist level on a non-metallic rope.			
RF Radiation (RF Burns)	Objects or areas that cause RF burns. Install on the RF burn source or in the immediate vicinity where easily seen. When used on cargo handling or running rigging, signs are to be mounted on the hook insulator; personnel are to be warned not to touch the wire/rigging above the insulator. More than one sign should be installed on larger burn sources that can be approached from more than one direction.			
RF Radiation (HERF)	Areas storing aviation gasoline or automotive gasoline. Installed above gasoline fueling stations.			
RF Radiation (Other RADHAZ)	Special areas where normal RADHAZ warning signs are not appropriate to ensure personnel safety. The sign contains a blank area in which special precautions, necessary for safe operations, can be typed.			
RF Radiation (Transmitters)	Areas designated by the command for not operating transmitters without prior permission from the OOD.			
RF Radiation (HERO)	Areas where ordnance is loaded, near the unit's magazines.			
RF Radiation (HERO Emission Control)	Areas, designated by the command, at or near transmitters. These areas have restrictions for RF emissions.			
High Voltage	Compartments or walk-in enclosures containing equipment with exposed conductors that present shock hazards in excess of 500V RMS or DC.			
Shock Hazard	Compartments or walk-in enclosures containing equipment with exposed conductors at potential of 30V RMS or DC and 500V RMS or DC.			
CPR Warning	Posted in all spaces where electronic equipment is present or personnel work. The sign should be viewable and readable from anywhere in the space.			
Multiple Power Sources	Labeling tag shall be affixed to the equipment, or the equipment's power sources, in a conspicuous place that can be viewed by personnel working on or near the equipment.			
Permissible RF Exposure Area (RADHAZ Type 1)	Area surrounding RF antennas where the PEL can be exceeded. Installed at eye level (or where the signs can easily be seen) outside the PEL boundary.			
Toxic Gas	One sign should be mounted near the bottom of each access ladder leading aloft and another sign should be located at the top of each ladder mounted on the outside of the antenna pedestal.			
Hearing Protection	Areas in which environments or equipment produce an 8-hour TWA of 85 dB (A) or greater.			

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Request for Feedback – ET2 UNIT 2: EQUIPMENT & PERSONNEL SAFETY

Suggestions and Corrections

Please note your suggestions, corrections, and comments below:

Page	Location on Page	What Correction is Needed

Your Comments

If you were writing this pamphlet, what improvements would you make? What was good about it? What did you not like about it? Please be specific in your comments/suggestions.

To Contact You

Please provide the following so that we can contact you if needed.

Name	Unit	Phone
		( )

Mail, Fax, or Call

Please mail, fax, or call your information to:

Commanding Officer
U.S. Coast Guard Training Center
Petaluma, CA 94952-5000

PHONE/FAX: (707) 765-7129/7033

ATTN: ET Subject Matter Specialist